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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/877,249	06/11/2001	Stanley John Becker	608-297	7974

23117 7590 04/20/2006

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EXAMINER	
LEUNG, JENNIFER A	
ART UNIT	PAPER NUMBER
1764	

DATE MAILED: 04/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/877,249	BECKER ET AL.	
	Examiner	Art Unit	
	Jennifer A. Leung	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 January 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,5,6,10-16,18-20,47,48,51,52,54-60 and 62-64* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,5,6,10-16,18-20,47,48,51,52,54-60 and 62-64* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant's amendment submitted on January 30, 2006 has been received and carefully considered. Claims 3, 4, 7-9, 17, 21-46, 49, 50, 53, 61 and 65 are cancelled. Claims 1, 2, 5, 6, 10-16, 18-20, 47, 48, 51, 52, 54-60 and 62-64 are under examination.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1, 2, 5, 6, 10, 11, 19, 20, 47, 48, 51, 52, 54, 55, 63 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Collin et al. (US 4,374,663) in view of Suess (US 2,794,681) and Chowdhury (US 4,461,743).

Regarding claims 1 and 47, Collin et al. discloses a reactor (FIG. 3; column 3, lines 36-60) comprising more than one nozzle **46** extending into the reactor. Additionally, Collin et al. discloses that each nozzle **46** may be constructed according to the types disclosed in FIG. 1 or FIG. 2 (column 2, line 58 - column 3, line 35), wherein each nozzle **46** comprises an inlet pipe for an oxygen-containing gas (i.e., supply pipe **4**) and a surround means for surrounding a substantial portion of the inlet pipe with a sealed, inert fluid (i.e., jacket **7**, containing a cooling medium **5**, such as water). In addition, Collin et al. discloses a fluidization means in the form of nozzles **50** opening out in the bottom of the lower reaction chamber **43** of the reactor. Collin et al., however, is silent as to whether the fluidization means may instead comprise a grid. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to substitute other known fluidization means, such as a grid, for the fluidization means

in the apparatus of Collin et al., on the basis of suitability for the intended use, because the Examiner takes Official Notice that the use of grids for providing adequate fluidization of a mass of solids is well known in the art, and it has been held that the substitution of known equivalent structures merely involves ordinary skill in the art.

Collin et al. is further silent as to surround means 7 including a means for detecting a change in pressure of the inert fluid **5** that surrounds the inlet pipe **4**, wherein the inert fluid **5** is present in a limited supply sufficient to replace minor leaks.

Suess (embodiment of FIG. 5; column 3, line 59 to column 4, line 32) teaches an inlet pipe (i.e., nozzle **3**) suitable for feeding gaseous substances to a reactor (column 5, lines 4-14), wherein the inlet pipe **3** comprises a surround means (i.e., jacket **3'**) surrounding a substantial portion of the inlet pipe **3** and provided with a sealed supply of a cooling medium (i.e., from a cooling medium source **5**, usually a liquid medium such as water; column 1, lines 38-55). In addition, Suess teaches means for detecting a change in pressure of the cooling medium **5** surrounding the inlet pipe **3** (i.e., by elements **10a**, **10b**, **10''** and **10'''**, which actuate according to a pressure difference, thereby initiating contact **11** to close the electric circuit and control a servomotor **9'''**), wherein the surround means **3'** is provided with a limited supply of cooling medium **5** sufficient to replace leaks (i.e., "by the contact **11** controlling servomotor **9'''** the amount of the cooling medium is increased at the moment in which the amount discharged decreases because of a leakage... In this manner the detrimental effect of a leakage on the cooling procedure may be compensated to a certain extent," column 4, lines 21-33).

It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide a means for detecting a change in pressure of the inert fluid of the surround

means in the apparatus of Collin et al., on the basis of suitability for the intended use and absent showing any unexpected results thereof, because the provision of such means would help avoid process disturbances due to leakage or similar defects occurring in the nozzles and parts or elements connected therewith, as taught by Suess (column 1, lines 17-33).

The collective teaching of Collin et al. and Suess is silent as to whether the supply of cooling medium **5**, such as water, may instead comprise a supply of inert gas. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to substitute a supply of inert gas for the supply of cooling medium **5** in the modified apparatus of Collin et al., on the basis of suitability for the intended use, because the use of inert gas for cooling nozzle structures is well known in the art, and the substitution of known equivalents merely involves routine skill in the art. Chowdhury (FIG. 4; column 4, lines 14-40) evidences conventionality by teaching an apparatus comprising an inlet pipe (i.e., oxygen pipe **20**) including a surround means for surrounding a substantial portion of said pipe with a supply of sealed, inert fluid (i.e., second pipe **21**, for defining a sealed, annular space **22** with an inlet **24** for a supply of inert fluid). In particular, Chowdhury teaches that suitable supplies of inert fluid include, "a *gas* such as air, nitrogen or carbon dioxide... injected into annular space **22**," or, in another form, "a fluid, *either gas or liquid*, is passed through the annular space... Heat is thus removed from oxygen pipe **20** by the heat transferring resisting fluid which is *typically one of nitrogen, carbon dioxide, air or water.*" Thus, a supply of an inert gas or a supply of a cooling liquid are known mediums in the art for providing the same function of cooling the inlet pipes.

Regarding claims 2 and 48, Collin et al. discloses, by illustration, at least 85% of the inlet pipe **4** being surrounded by surround means **7** (see FIG. 1, 2).

Regarding claims 5 and 51, surround means 7 comprises one or more outer pipes surrounding a substantial portion of inlet pipe **4** (i.e., the nozzles comprise plural outer pipes as defined by jacket **7** and wall **17**; FIG. 2).

Regarding claims 6 and 52, Collin et al. is silent as to the apparatus comprising differential expansion means for the inlet pipes **4** and surround means **7**. As defined by the specification (page 4, lines 5-7) differential expansion means may include bends in the inlet pipe and/or pig-tails. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to provide means for allowing differential expansion of the inlet pipes and the surround means in the modified apparatus of Collin et al., on the basis of suitability for the intended use, because the Examiner takes Official Notice that the provision of bends and/or pig-tails in pipes for enabling differential expansion is well known in the art. Chowdhury (FIG. 4; column 4, lines 14-40) further evidences the conventionality of such a configuration by teaching an inlet pipe **20** and surround means **21** comprising differential expansion means (i.e., as shown in the figure, a 90-degree bend of the pipes).

Regarding claims 10, 11, 54 and 55, the reactor comprises means for suppressing ingress of reactants into the inlet pipes **4**, wherein said means comprises providing the oxygen containing gas in the inlet pipe **4** at a pressure higher than the pressure in the reactor, using a compressor **45** (FIG. 3).

Regarding claims 19 and 63, Collin et al. illustrates the oxygen-containing gas being supplied to inlet pipe **4** via a common end box having inventory (i.e., a supply line **3** containing oxygen, comprising an annular conduit surrounding reactor **41**; FIG. 1, 3; column 2, lines 58-64).

Regarding claims 20 and 64, Collin et al. discloses, "Preheated air was supplied through

the nozzles **46** at *a rate required for producing the heat of reduction and for maintaining, by partial combustion of the coal, a temperature of 970 °C in the reactor*," (column 4, lines 56-59). However, Collin et al. is silent as to the nozzles being operably connected with "flow restriction means". In any event, such control elements would be inherent of the apparatus of Collin et al., as evidenced by the apparatus having the ability to vary and maintain a sufficient rate of air supply, and hence, a sufficient reaction temperature. Also, it would have been obvious for one of ordinary skill in the art at the time the invention was made to provide such flow restriction means to the nozzles in the modified apparatus of Collin et al. because the Examiner takes Official Notice that the provision of fluid control means, such as flow restrictions, for enabling the regulation of a feed rate to a reactor is well known in the art.

3. Claims 12-16 and 56-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Collin et al. (US 4,374,663) in view of Suess (US 2,794,681) and Chowdhury (US 4,461,743), as applied to claims 1 and 47 above, and further in view of Stephan et al. (US 3,411,716).

Regarding claims 12, 13, 56 and 57, Collin et al. is silent as to the inlet pipe **4** comprising ingress suppression means in the form of a restriction to the outlet of the inlet pipe. Stephan teaches a water-cooled oxygen injection nozzle (FIG. 1, 3; column 2, lines 41-69) comprising an inlet pipe **1** that is surrounded by a water-cooling jacket defined by concentric pipes **4** and **5**. Additionally, the inlet pipe **1** comprises a restriction to the outlet of the inlet pipe **1** (i.e., plug **15** with control pipe **20**; FIG. 3, 4), the restriction further defining an orifice (i.e., a venturi orifice defined by insert **23**). It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide a restriction to the outlet of the inlet pipe in the modified apparatus of Collin et al. because the oxygen distributing action of the nozzle is enhanced by the

axial jet of oxygen projected centrally thereof from the orifice of the restriction, as taught by Stephan (column 3, lines 3-17).

Regarding claims 14-16 and 58-60, although the collective teaching of Collin et al. and Stephan et al. is are silent as to the restriction being located at the specifically recited locations, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select an appropriate location for the restriction in the modified apparatus of Collin et al., on the basis of suitability for the intended use, since shifting location of parts was held to have been obvious, and where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges involves only routine skill in the art.

4. Claims 18 and 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Collin et al. (US 4,374,663) in view of Suess (US 2,794,681) and Chowdhury (US 4,461,743), as applied to claims 1 and 47 above, and further in view of Wagner et al. (U.S. 5,801,265).

The collective teaching of Collin et al., Suess and Chowdhury is silent as to the distance between the inlet pipes being significantly in excess of the potential flame length. Wagner teaches a reactor **36** comprising oxygen gas inlets **60**, wherein the inlets **60'**, **60"** are positioned such that the distance **D** between inlets **60'**, **60"** is significantly in excess of a potential flame length (FIG. 3; column 4, lines 15-38). It would have been obvious for one of ordinary skill in the art at the time the invention was made to configure the inlet pipes at a distance significantly in excess of the potential flame length in the modified apparatus of Collin et al., on the basis of suitability for the intended use, because such arrangement provides an improved system for introducing oxygen containing gas that avoids explosions, deflagration, or other anomalous process conditions, as taught by Wagner (column 2, lines 13-18).

Response to Arguments

5. Applicant's arguments filed January 30, 2006 have been fully considered but they are not persuasive.

On page 11, second paragraph, Applicants argue,

> "Collin at col. 1, lines 61-64 clearly states that cooling the nozzle with air would not solve the problem that Collin is trying to achieve, i.e., to prevent iron particles sticking to the nozzle."

On page 12, first paragraph, Applicants argue,

> "Although Chowdhury discloses a heat transfer resisting fluid such as nitrogen, carbon dioxide, air or water, Collin is quite clear that a gas is inappropriate for solving the problem of particles sticking to a nozzle and therefore solves the problem by employing a liquid."

The Examiner respectfully disagrees. Applicants are correct in that the cooling of nozzles with air, as discussed under the prior art section of Collin, is inferior because the air-cooling is not able to prevent the sticking of pulverulent material to the nozzles and the walls of fluidized beds when the materials being reduced contain iron oxide. However, please note that nonpreferred embodiments still constitute prior art. As set forth in M.P.E.P. section 2123,

> Disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments. *In re Susi*, 440 F.2d 442, 169 USPQ 423 (CCPA 1971). A known or obvious composition does not become patentable simply because it has been described as somewhat inferior to some other product for the same use." *In re Gurley*, 27 F.3d 551, 554, 31 USPQ2d 1130, 1132 (Fed. Cir. 1994). (The invention was directed to an epoxy impregnated fiber-reinforced printed circuit material. The applied prior art reference taught a printed circuit material similar to that of the claims but impregnated with polyester-imide resin instead of epoxy. The reference,

> however, disclosed that epoxy was known for this use, but that epoxy impregnated circuit boards have "relatively acceptable dimensional stability" and "some degree of flexibility," but are inferior to circuit boards impregnated with polyester-imide resins. The court upheld the rejection concluding that applicant's argument that the reference teaches away from using epoxy was insufficient to overcome the rejection since "Gurley asserted no discovery beyond what was known in the art." 27 F.3d at 554, 31 USPQ2d 1132).

In the instant case, the fact that the cooling of nozzles with air was found inferior to the cooling of nozzles with a medium such as water does not teach away from the use of air as a cooling medium. The use of air as a nozzle-cooling medium does not constitute a discovery beyond what was already known in the art.

Additionally, one having ordinary skill in the art at the time the invention was made would understand that the choice of a cooling medium ultimately depends on the intended use of the apparatus. For instance, the prior art discussion in Collin (column 1, lines 20-68) suggests that the use of air as a cooling medium may be suitable in cases where the pulverulent material being reduced does not contain iron oxide.

It is further noted that the solution to the problem of iron oxide adherence as proposed by Collin is not that the cooling medium must be a liquid, but that the cooling medium must be capable of cooling the exterior surface of the nozzles to a temperature lower than 200 °C below the melting point of the reduced metal. (see abstract; column 2, lines 3-19). The Examiner asserts that one having ordinary skill in the art at the time the invention was made would have selected an appropriate temperature for the cooling medium (i.e., an appropriate temperature for the inert gas, as modified by the teachings of Chowdhury) in order to obtain the desired nozzle

condition in the apparatus of Collin. The Examiner is unaware of any portion of the Collin disclosure that indicates that the cooling medium must be a liquid. Throughout the disclosure, Collin indicates that the water is merely a preferred or exemplary embodiment (see column 2, lines 11-13; column 2, lines 64-65). Again, disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments. It is further noted that Collin discloses cooling with a "cooling gas" in other portions of the nozzle (see column 2, lines 29-43; column 3, lines 7-30).

On page 11, second paragraph, Applicants further argue,

> "... Suess requires a supply of water to the cooling jacket and a discharge of the water therefrom in order to detect the pressure change. That is, the cooling jacket is required to have an inlet and an outlet for the liquid and so is a continuous system. Suess would not work if the cooling jacket was sealed because, in a sealed system, the two membranes of Suess would register the same pressure and, if a leak occurred, the two membranes would still read the same pressure, albeit a lower pressure. In the present invention, the inert gas does not flow in a continuous system. Rather, it is a sealed system."

The Examiner respectfully disagrees. It is noted that the features upon which applicant relies (i.e., a surround means having an inlet, but no outlet, for the inert gas supply) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

* * *

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is (571) 272-1449. The examiner can normally be reached on 9:30 am - 5:30 pm Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jennifer A. Leung
April 15, 2006

ALEXA DOROSHENK NECKEL
PRIMARY EXAMINER